Anthology Of Two NASA Discovery Projects

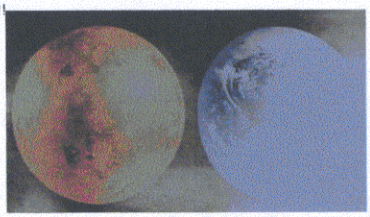
Their Missions And Character

GENESIS
SEARCH FOR ORIGINS

DR. GILBERT YANOW
Outreach Coordinator
Special Consultant, Deep Impact

WHY A GENESIS MISSION?

We See The Planets As They Are Today, Venus, Mars, Earth. All Are Very Different, But If The Planets And Sun Were All Formed At The Same Time, They Must Have All Been The Same When Our Solar System Began--The Question Is How Were They Then And Can We Tell How And Why They Changed!!



Venus-Nobody Can Live There Now

Earth- We All Live Here

WHAT ARE SOME OF THE "BIG" QUESTIONS?

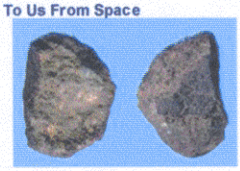
(1) How Can We Explain the Great Diversity of Planetary Objects?

(2) What Made Earth Different From Its Planetary Neighbors?

(3) The Planets All Started From The Same Planetary Nebula And Then Changed Over Time--But What Was That Starting Composition?

WHERE CAN WE SEEK ANSWERS?

- What Comes To Us From Space



This Is A Picture Of A Piece Of The Allende Meteorite That Fell To Earth At Chihuahua Mexico, Feb. 9, 1969

It Is Believed To Be The Order of 4.6 Billion Years Old, Dating It With The Formation Of Our Solar System. It Is The Oldest Material Identified To Date

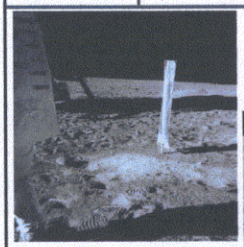
What Has Happened To It Over Those Many Many Years?

What Do We Need To Really Do ?

We Need To Some How Get Pieces Of The Sun From Outside The Cloak Of The Earth's Magnetic Field

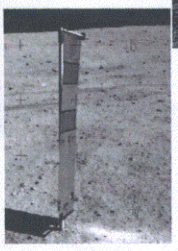
We Then Need To Analysis This Material For Many Isotopic Ratios Better Than We Have Done In The Past

HOW DO WE HAVE SOLAR COMPOSITION? (The Moon Adventures Lead The Way)



The Apollo 11 "Foil" Experiment

Apollo 12 Foil



Apollo 16 Experiment

WHAT APOLLO SOUGHT TO UNDERSTAND

The Apollo Solar Wind Experiments Trapped Solar Particles On Aluminum Foil. These Foils Were Brought Back To Earth. Using The Best Methods Of Analysis At The Time, The Amounts Of Some Elements And Isotopes (Different Varieties Of The Same Element) Were Determined

An Example Of What Was Discovered

On Earth There Is 9.80 Times More Neon(20) Than Neon(22)
Analysis Of The Apollo Foils Said The Sun Value Is About 13.7

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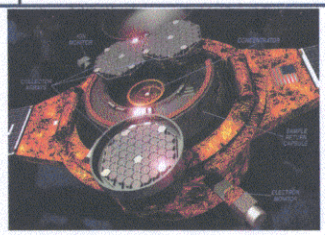
ENTER THE GENESIS MISSION (Our Adventure Begins)



Genesis Is A Small Spacecraft That Will Remain In Space (A Million Miles From Earth) Collecting Bits Of Solar Wind, For About Two Years, Bring Them Back To New Earth Laboratories For The Most Detailed Analysis Ever Done To Determine The Building Blocks Of Our Solar System

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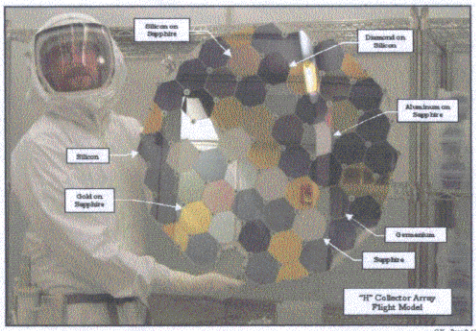
A FINISHED ARRAY



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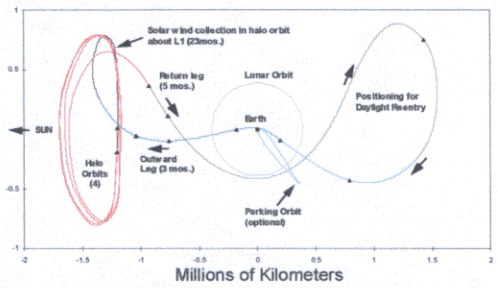
HOW DO YOU STAY A MILLION MILES FROM EARTH FOR TWO YEARS?



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THE WELCOME HOME (The End Of Phase One Of The Adventure)

A "Chopper" Will Catch The Re-entered Capsule At An Air Speed Of About 35 mph Over The Deserts ~~Of Utah~~.

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GENESIS WILL INVITE SCIENTISTS FROM ALL OVER THE WORLD TO JOIN THE QUEST (We Want To Share The Adventure)

The Returned Wafers, Full Of Sun Particles, Will Be Stored In A Special New Area At JSC, Near Where The Moon Rocks Are Archived.

For The Next Century Genesis Materials Will Be Made Available to Scientists All Over The World Who Wish To Conduct Investigations.

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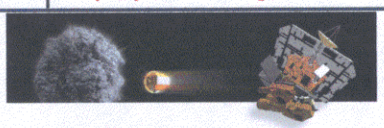
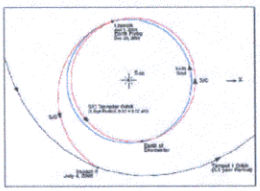
Deep Impact "Shooting A Comet"



- Deep Impact Is A New Mission That Also Seeks To Find Out More About Our Origins
- Deep Impact Will Find Out More About What Is Inside A Comet
  - Many Feel Comets Contributed To The Development Of The Earth, Say In Providing One Source Of Water
- How Do You Do That?---Shoot It!!
  - Well Not Exactly

Deep Impact "Shooting A Comet"

- We Will Put An Instrumented Spacecraft In The Orbit Path Of Tempel 1
- Our Spacecraft Will Send An Instrumented Probe (about 450 kg, Made Mostly Of Copper) Toward The On Coming Comet And Get Out Of The Way
- The Impact Will Produce A Crater 10-20 meters Deep (I.e. Deep Impact)
- The Spacecraft And Earth Bound Observers Will Analysis The Ejected Materials



What Are Common Threads Of These Projects

- There Is A Team For System Engineering--The People Who Will Design And Make The Spacecraft
- There Is A Team To Get It Launched, Get It Operational And Then Control The Spacecraft And Operate The Mission
- There Is A Team Of Scientists Who Work With The Other Teams To Make Sure The Spacecraft Will Get The Required Data And Then They Use It

Realize

- Almost Every Spacecraft Is Different Because Usually The Missions Are Different
- Each Mission Brings With It New "Insurmountable Problems"
- You Must Start Every Mission Knowing You May Have To Change or Modify Your Initial Ideas and Designs
- Remember, Your Mission Was Funded Because The Knowledge It Will Bring Is Important
  - You Have Been Funded To Find Out How To And Then Do The Mission
  - If You (Or Anyone Else) Already Knew Exactly How To Do It, Your Project Would Not Have Been Undertaken!!

How Do I Prepare Myself For These Jobs

- Make Sure You Learn Your Basic Concepts And Fundamentals
  - No Matter What The Problems, The Laws Of Physics And Basic Analysis Techniques Still Seem To Hold
- The Main Skills To Bring With You To This Environment Are Knowing How To Learn And Attempt To Understand
  - (1) New Concepts
  - (2) New (And Some Times Weird) Ideas
  - (3) Be Willing To Learn New Ways To Do Things
- *(In My View)* If You Are Really A Good Student, You Will Realize How Much You DO NOT Know, But You Will Have The Self Confidence To Take On New And Challenging Jobs That Will Require You To Learn New Things And Do Things In Different Ways

Interactions With Minority Institutions

- Now
  - M.O.U. With Cal. State Northridge To Allow Students (All Levels) To Work With Our Projects
  - The NSF Chautuaqua Program (JPL Is Cal Field Center, Dr. Yanow Director)
    - Provide Intensive 3 And 4 Days Courses On Area Of Content And Teaching Methods (Several Courses Specialize On NASA Projects)
- The Future
  - Chautuaqua
    - Not Only Attend Courses, Act As Venue And Also Give Them At Their Institutions
  - Genesis
    - Our Principal Investigator Would Welcome MI's To Work With The Science (If Qualified)
      - Surface and Materials Chemistry and Science
  - Deep Impact
    - Again MI Scientists And Students Would Be Welcomed To Work On The Science
      - Astronomy